

DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER POLLUTION CONTROL  
6<sup>TH</sup> FLOOR, L&C ANNEX, 401 CHURCH ST, NASHVILLE, TN 37243

**NOTICE OF INTENT (NOI)**  
for discharges of treated groundwater associated with  
**UNDERGROUND STORAGE TANK (UST) REMEDIATION**

This application is for: ☒ New Permit ☐ Permit Reissuance ☒ Permit Modification

(If this NOI is submitted for Permit Modification provide the existing permit tracking number: TNG83 \_\_\_\_\_)

Site Name: <b>Quik-N-Easy Market</b>	County: <b>Smith</b>
Street Address or Location: <b>107 Main Street North, Carthage, TN 37030</b>	*Latitude: <b>36 14' 57" N</b>
	*Longitude: <b>85 57' 02" W</b>
UST Site ID Number: <b>4-800064</b>	Attach a site location (topographic) map <input checked="" type="checkbox"/> Map attached

Owner or Operator: (the person or legal entity which controls site's operation; this may or may not be the same as the site name or the official contact name) <b>Rankin Oil</b>			
<b>1</b>	Official Contact Person Name: (individual responsible for a site) <b>Mark D. Harper</b>	Title or Position: <b>Director of Engineering</b>	
	Mailing Address: <b>P.O. Box 149</b>	City: <b>Hartsville</b>	State: <b>TN</b> Zip: <b>37074</b>
	Phone: <b>615-374-4745</b>	E-mail: <b>eph Harper@aol.com</b>	
<b>2</b>	Local Contact Person Name: (if appropriate, write "same as #1") <b>Same as #1</b>	Title or Position:	
	Site Address: (this may or may not be the same as street address)	Site City:	State: <b>TN</b> Zip:
	Phone:	E-mail:	

Write in the box (to the right) or circle the number (above) to indicate where to send correspondence:

**1**

**UST REMEDIATION FACILITY DESCRIPTION**

Treated groundwater from site enters following stream(s) and/or lake(s): (for each outfall, give names and stream miles) <b>Outfall flows into a storm water sewer South 80', then storm water sewer turns East 850' until it dumps into the Cumberland River</b>	No. of outfalls: <b>1</b>
List type of product(s) currently or previously stored in tanks located at the site: <b>Gasoline</b>	
Description of contamination, assessment study, extent of contamination, etc. Attach additional pages if necessary. <b>Appendix A, Site Status Monitoring Report</b>	
Description and design capacity of treatment process and facilities. <b>Capacity 40 gallons per hour, Appendix B, System Information Packet.</b>	
Select discharge type (continuous means more than 4 days at a time): <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent	
Expected starting date for groundwater treatment, and estimated life of remediation project: <b>Currently in use</b>	

**CERTIFICATION AND SIGNATURE**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**Mark D. Harper, P.E.** **Dir. of Engineering**  **12/16/11**  
Printed Name Official Title Signature Date

**STATE USE ONLY**

Received Date	Reviewer	EFO	NOC Date	Tracking No. <b>0114</b> TNG83
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Submit the original of the completed and signed form to:

**UST NOI Processing**  
**Tennessee Division of Water Pollution Control**  
**6<sup>th</sup> Floor L&C Annex, 401 Church Street**  
**Nashville, TN 37243**

(continued)

RDAs 2399 and 2400

DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF WATER POLLUTION CONTROL  
6<sup>TH</sup> FLOOR, L&C ANNEX, 401 CHURCH ST, NASHVILLE, TN 37243

**NOTICE OF INTENT (NOI)**

for discharges of treated groundwater associated with

**UNDERGROUND STORAGE TANK (UST) REMEDIATION**

	Impaired Receiving Stream	High Quality Water	T & E Aquatic Fauna
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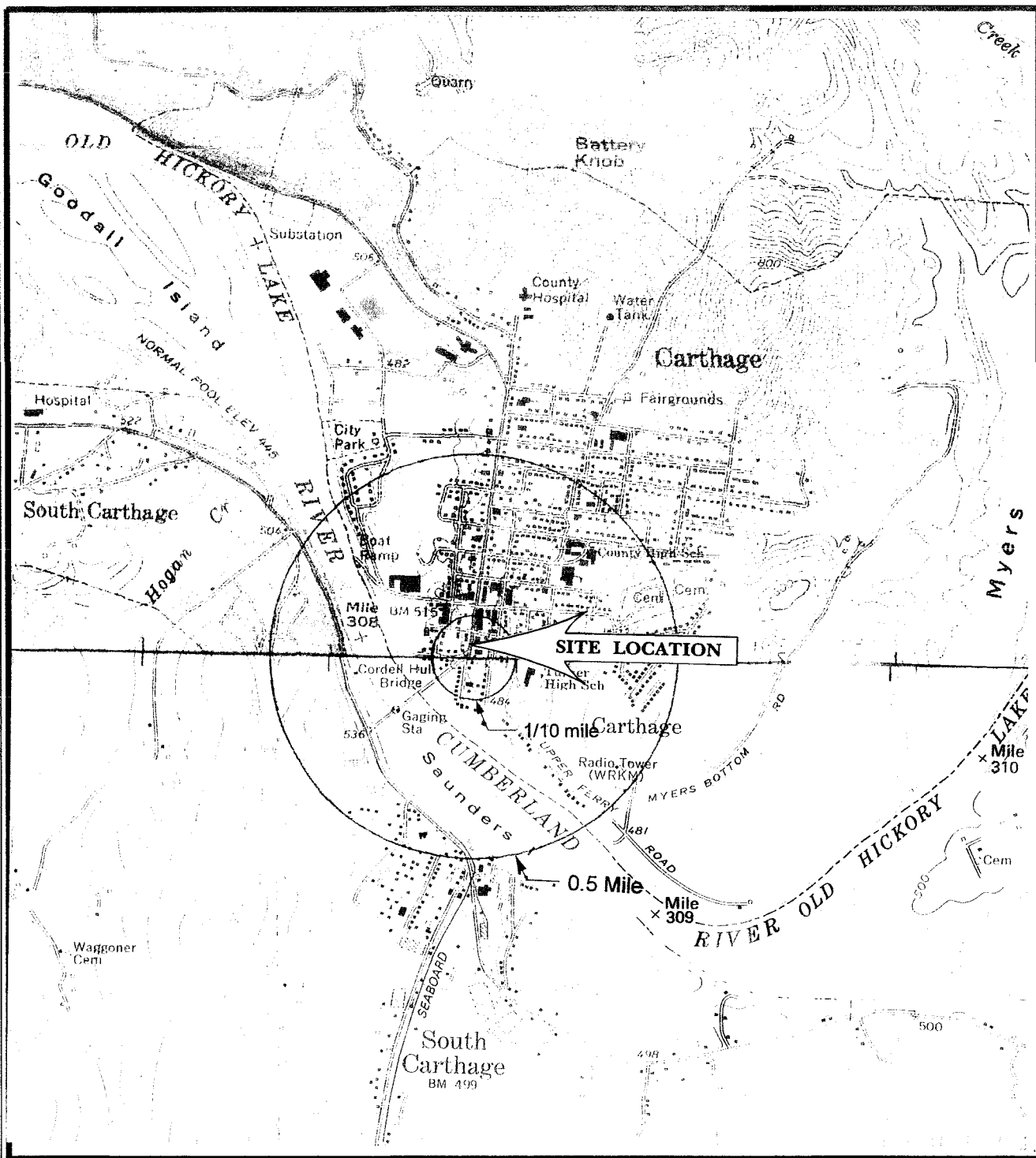
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TECHNICAL SERVICES  
NASHVILLE, TN 37243

Submit the original of the completed and signed form to:

**UST NOI Processing**  
**Tennessee Division of Water Pollution Control**  
**6<sup>th</sup> Floor L&C Annex, 401 Church Street**  
**Nashville, TN 37243**



COLOR TOPOGRAPHIC MAP FOR DRINKING AND SURFACE WATER

Compliance Engineering Co. of the South  
P.O. Box 149  
Hartsville, TN 37074

Quik-N-Easy Market  
UST ID# 4-800064

## Appendix A

1. The first part of the appendix is a list of the names of the people who were interviewed for the study. The names are listed in alphabetical order.

2. The second part of the appendix is a list of the questions that were asked during the interviews. The questions are listed in the order in which they were asked.

3. The third part of the appendix is a list of the answers that were given to the questions. The answers are listed in the order in which they were given.

4-800064

**Corrective Action Monitoring Report Cover Page**

**Date of CAMR:** September 14, 2011

**Type of Monitoring Report:**

- ☐ Corrective Action Baseline Monitoring Report (CABMR)
- ☐ Corrective Action Monitoring Report – with as-built diagrams (CAMR-ab)
- ☒ Corrective Action Monitoring Report (CAMR)
- ☐ Corrective Action Closure Monitoring Report (CACMR)

**Dates of Monitoring Period (from/to):** February 2011 to August 2011

**UST Facility Identification Number:** Facility # 4-800064

**UST Facility Name:** Quick-N-Easy Market #2

**UST Facility Address:** 107 Main Street  
Carthage, Smith County, Tennessee


**Case Number:** 1

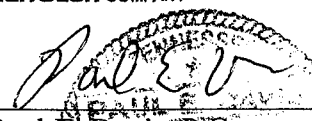
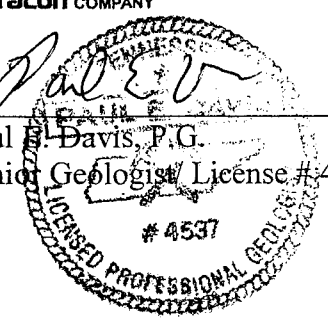
**Name of the PAR for implementation of the CAP (This is the individual such as the tank owner, tank operator, property owner, or a specific representative of the business authorized to act on behalf of that business):**

CAMR Prepared for Rankin Oil Company

**Name of the CAC company and individual(s) who prepared the CAMR including applicable license/registration type and number:**



  
Travis T. Stamper  
Senior Environmental Scientist

  
Paul B. Davis, P.G.  
Senior Geologist License #4537  


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## INTRODUCTION

The Quik-N-Easy Market #2 is located at 107 Main Street, Carthage, Smith County, Tennessee. The site came under scrutiny on October 13, 1994, when free phase product was discovered in the observation well for the underground storage tanks (USTs). The Tennessee Division of Underground Storage Tanks (TDUST) requested that a subsurface investigation be conducted at the subject property by installing soil borings and groundwater monitoring wells. Earthen Environmental Services, Inc. (EES) conducted the subsurface investigation by installing nine monitoring wells in February and May 1995. The results of the investigations were reported in the Initial Site Characterization Report (ISCR) and in an Environmental Assessment Report (EAR) July 31, 1995. The investigation confirmed that the soil and groundwater had been impacted at the site by a release from the UST system. EES established that no private or public water supplies were in use within a 0.5-mile radius of the site.

Aquaterra was retained to continue the environmental investigation at the subject property in January 1998. At that time, free phase product was present in five of the monitoring wells at the site. As an abatement measure, three Mobile Enhanced Multiphase Extraction (MEME) events were conducted at the site.

Free phase recovery and monitoring of the site conditions continued until the Division requested that the full extent of the impact of petroleum contamination in soil and ground water be determined. Aquaterra installed three monitoring wells, MW-10, MW-11 and MW-12, at the site on October 17 and 18, 2000. Aquaterra installed three soil borings, two of which were converted into groundwater monitoring wells (SB-12A, MW-13 and MW-14) off site on August 14, 2002. Five additional soil borings were converted into groundwater monitoring wells off site on January 14, and July 31, 2003. The investigation revealed that ground water at the subject property is present in two aquifers. The depth to groundwater varies from less than 2 feet to 60 feet below ground level (BGL).

During the August 6, 2003 groundwater monitoring event, free product was measured only in MW-12, and concentrations of benzene were found to exceed the applicable level of 0.07 ppm in groundwater samples. TPH concentrations also exceeded the applicable clean up level of 1.0 ppm. The benzene and TPH contamination plume map suggest that there may have been two petroleum releases. One source is potentially at the Quik-N-Easy Market and another source is potentially on the east side of Main Street.

In a letter dated December 7, 2007 TDEC required the Rankin Oil Company to properly abandon twelve of the previously installed groundwater monitoring wells located on and near the subject property. The locations of these abandoned groundwater monitoring wells are illustrated on Figure 2, the detailed site map. On December 26, 2007, Aquaterra abandoned twelve groundwater monitoring wells on and near the subject property. The following monitoring wells remain at the subject property: MW-1, MW-4, MW-6, MW-7, MW-12, MW-15, and MW-19.

On October 10, 2008, Aquaterra conducted a Site Status Monitoring Event at the subject property and subsequently a Site Status Monitoring Report (SSMR). During this sampling event benzene, ethylbenzene, toluene, xylenes, MTBE and naphthalene concentrations were detected above the laboratory detection limits in the groundwater samples collected. Due to the presence of free phase product and elevated levels of COC's it was recommended that a risk evaluation be performed.

On December 3, 2008, Aquaterra evaluated the site under the guidelines of Technical Guidance Document 017- Risk Assessment for Underground Storage Tanks Sites (TGD-017). In a letter dated January 16, 2009 the Division approved the following site specific clean-up levels:

Site Specific Clean-up Levels		
Chemical	Soil Clean-up Level (ppm)	Ground Water Clean-up Level (ppm)
Benzene	7.57E-02	2.38E-01
Toluene	6.78E+00	1.48E+01
Ethylbenzene	1.43E+02	1.03E+01
Xylenes (Total)	9.60E+00	1.23E+01
MTBE	3.96E+01	1.75E+02
Naphthalene	1.35E+02	9.81E+00

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IN Division Of Water Pollution Control

Due to onsite concentrations being above the calculated SSCL's, a Corrective Action Plan was completed in February 2009, which developed a cost effective method for reducing the soil and groundwater petroleum contaminant concentrations at the site. In August of 2009, the groundwater remediation system was installed. At the time of this report, the remediation system has been activated and is in operation. This report represents the seventh corrective action monitoring report for the site since the installation of the remediation system.

## I. Monitoring Progress, Problems, and Results

Provide the most current information in accordance with the requirements set forth below:

### A. Progress

#### 1. System installation or modification information

Provide a description of CAS installation or modification activities. Upon system installation and/or after any modification directed by the Division, the following information shall be submitted in the CAMR-ab. Supporting documentation shall be included in an appendix.

- a. "As built" equipment and site diagrams for each CAT. The "as built" diagrams shall include at a minimum: a process and flow diagram, a site map including the extraction wells, CAS trenches, monitoring wells or extraction points, and system compound layout. If "as built" diagrams are provided in other types of reports (i.e., reports subsequent to the Corrective Action Baseline Monitoring Report that do not follow a major modification, etc.) then the cost of those diagrams will not be reimbursed from the Fund;  
NA
- b. A CASIACL (located in the "Corrective Action Workbook");  
**See previously submitted CASIACL**
- c. All boring logs for extraction wells or extraction points completed in accordance with TGD-006, "Standard Drilling Log"; and,  
**See Appendix A: Boring Logs**
- d. Copies of approved discharge and/or emission permits or permit renewals.  
**See Appendix B: Approved Permits**

2. Site remediation progress

Provide a summary of remediation progress including, but not limited to, changes to receptors, analytical result trends, free product thickness trends, CAS performance trends, etc.

**Site Remediation Progress:**

The remediation system was installed August 26, 2009. Figure 1 illustrates the location of the corrective action system and associated recovery piping and recovery wells. The groundwater wells and the recovery wells were sampled while the remediation system was in operation. Analytical data collected during this monitoring period indicated benzene concentrations were found to be above the site specific cleanup level of 0.238 parts per million (ppm) in all the sampled groundwater monitoring wells and all the sampled groundwater recovery wells DRW-3 and DRW-4. The concentrations of benzene encountered in the groundwater monitoring wells MW-7, MW-12 and MW-15 were 0.606 parts per million (ppm), 3.83 ppm, and 0.290 ppm, respectively. The concentrations of benzene encountered in the groundwater recovery wells DRW-3 and DRW-4 were 0.593 and 0.363, respectively. The benzene levels reported during this event indicate a decrease in concentrations from the previous sampling event in the groundwater monitoring wells MW-12 and MW-15. The analytical data also indicates an increase in benzene concentrations in the groundwater monitoring well MW-7 and both sampled groundwater recovery wells DRW-3 and DRW-4. In addition to the benzene being above the site specific action level of 0.290 ppm in the groundwater monitoring well MW-

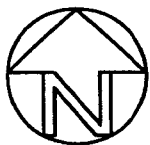
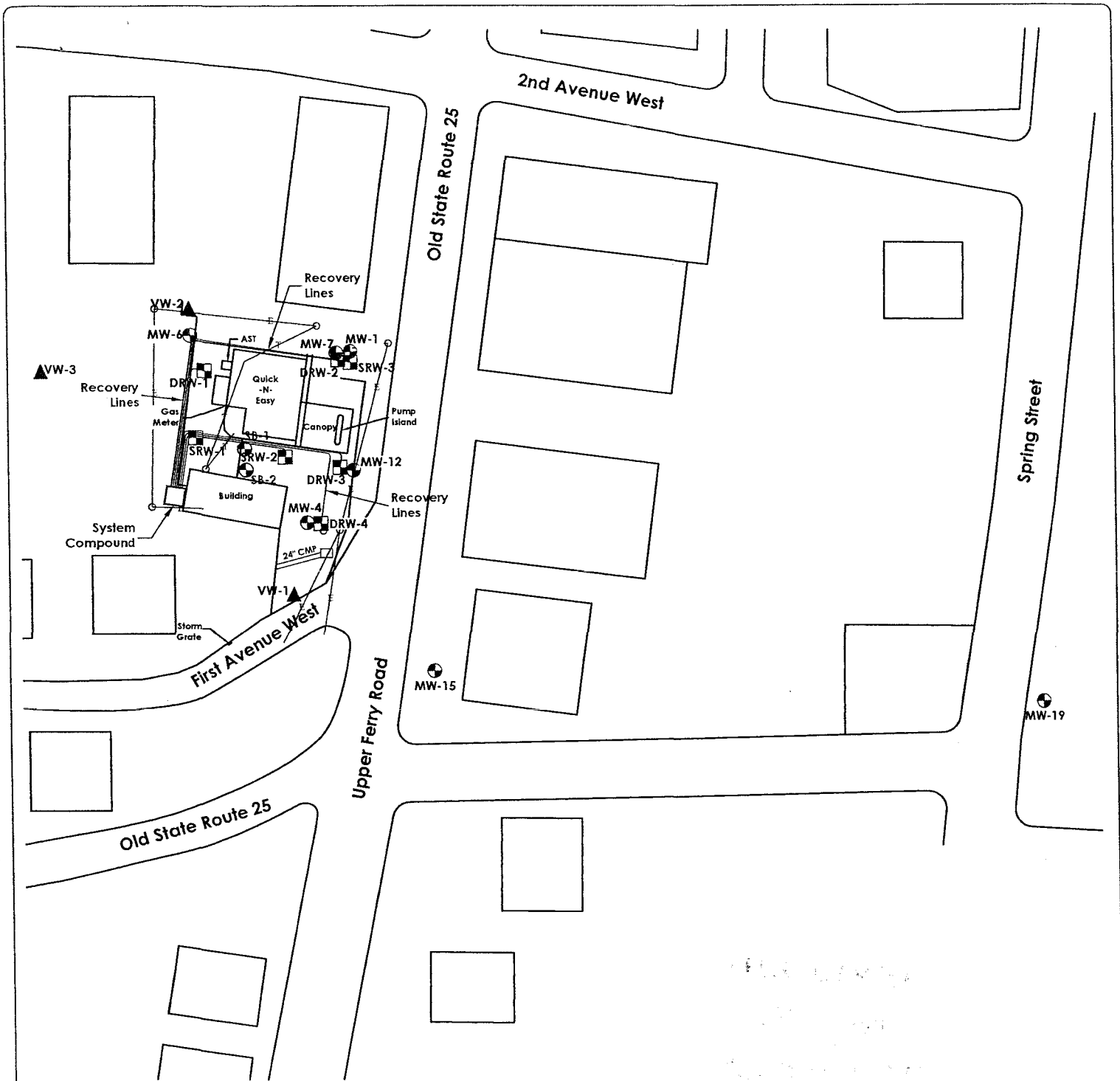
12, analytical data indicated that the concentration of xylenes in monitoring well MW-2 was also above the site specific action level of 12.3 ppm at a concentration of 16.6 ppm. This is a decrease in concentration from the previous groundwater sampling event.

Free phase product was detected in the groundwater monitoring well MW-12 at a thickness of 0.22 feet. This is a decrease in free product thickness from the previous sampling event. The free product was bailed from the well and placed into the remediation system for processing and disposal.

On August 2, 2011 an Aquaterra drill crew mobilized to the site to collect subsurface soil samples from two locations across the site. Soil samples were collected from two areas adjacent to the west the former Underground Storage Tank (UST) tank pit. Previous soil samples collected from these areas were identified as B-1 at 8–10 feet below the ground surface and B-2 at 10–12 feet below the ground surface. The bi-annual soil samples were collected from adjacent to the previously collected soil sample locations B-1 and B-2. Soil boring SB-1 was collected adjacent to and from the same depth below the ground surface as B-1. Soil boring SB-2 was collected from adjacent to and from the same depth below the ground surface as B-2. The purpose of this soil boring location is to determine if there is a potential for onsite soil contamination to have migrated under the onsite store.

Both soil boring SB-1 and SB-2 were sampled on August 2, 2011 for benzene, toluene, ethylbenzene, and xylenes (BTEX), MTBE, and naphthalene. Analytical data indicated that the soil sample collected from SB-2 at 10–12 feet was below the site specific action level. However, the soil sample collected from SB-1 at 8–10 feet was above the site specific action level of 0.0757 ppm for benzene in soil. The benzene level encountered in the soil sample collected from SB-1 was 0.162 ppm. The previously collected soil sample from the same area previously identified as B-1 contained a benzene concentration of 1.81 ppm. This is a decrease in concentration from the previous soil sampling event.

Groundwater and soil analytical data as well as free product data are discussed further in the Results section of this report.



0 40 80  
1" = 80'

#### Legend

- Monitoring Well Location
- Boring Locations
- Deep Recovery Wells
- Shallow Recovery Wells
- Vacuum Wells

3. CAS progress

Provide the progress and effectiveness of the CAS since the last report. Information in the report shall include, but not be limited to, a discussion of the following:

- a. CAS performance relative to the performance measures (PMs) established in the approved CAP.
  - i. CAS adjustments affecting performance. This includes, but is not limited to, drop tube adjustments and changes in the number and designation of extraction wells online and/or offline;
  - ii. CAS runtime (% uptime);
  - iii. For DPVE systems, air stripper efficiency (%);
  - iv. Contaminant removal efficiency (%);
    - (a) Free product extraction [current thickness versus thickness at the time of installation (%)], if applicable;
    - (b) Ground water concentration reduction [current concentration (ppm) versus concentration at the time of installation (% reduction)], if applicable; and,
    - (c) Soil concentration reduction [current concentration (ppm) versus concentration at the time of installation (% reduction)], if applicable; and,
  - v. CAS effluent evaluation with applicable permit requirements and to determine the continued use of GAC and bag filter components.
- b. Additional information

Provide any additional information that was not included in the approved CAP or required by the Division. If applicable, then provide this additional information in tables and/or maps.

**CAS Performance:**

**Corrective action activities at the Quik-N-Easy Market #2 site consist of a dual-phase oil-sealed liquid-ring extraction system with seven vertical extraction points (three shallow and four deep recovery wells). Groundwater and vapors are recovered by a 40 horsepower oil-sealed liquid-ring vacuum pump capable of producing a vacuum of 18 inches of mercury. The groundwater is then remediated by an oil/water separator, an air stripper, and granular activated carbon. All components are rated for a minimum of 10 gallons per minute (GPM) flow rate. The treated groundwater is discharged under an NPDES permit to a nearby storm drain. (Appendix B)**

**In order to monitor the effectiveness of the corrective action system, the following performance measures (PM) will be utilized once the system has**

been activated. These performance measures serve as triggers for enacting contingencies if they are not met.

- PM-1:** The site vicinity shall be visually inspected for changes in the receptors identified within the Exposure Assessment annually in conjunction with a monitoring event. If a significant change in a receptor is noted a revised Exposure Assessment shall be completed to determine the new applicable SSTLs. The site vicinity is visually inspected during every groundwater monitoring event. If a change in the receptors is observed it will be communicated to the Aquaterra project manager for further evaluation.
- PM-2:** The average system run time evaluated on a semi-annual basis shall not be less than 85%. If the system down time exceeds 15% a corrective action status meeting may be scheduled with the TDUST, responsible party, and Aquaterra personnel to discuss options to increase the system runtime. The average system down time for this monitoring period (from February 7, 2011 through August 3, 2011) has been 15% attributed to sediment clogging of the carbon vessels, the replacement of the carbon in the vessels, electrical outages, power fluctuations, maintenance of the system involving replacing air stripper tubes, replacing damaged air water stripper probe, and routine maintenance. Monthly runtime readings are presented in Table 1. CAS performance data is presented in Table 2. System status and inspection data is presented in Table 3. CAS Telemetry reports are provided in Appendix C.
- PM-3:** A detectable vacuum reading shall be maintained within all recovery wells. If a vacuum is not maintained a corrective action status meeting may be scheduled with the TDUST, the responsible party, and Aquaterra personnel to discuss possible problems and solutions to reestablish an appropriate vacuum. The vacuum readings collected from the vacuum monitoring wells have been historically recorded as 0.00. These low readings are most likely the result of not extracting from all the recovery wells and the karst geology at the site. Extraction from additional recovery wells will commence when recovery rates allow. Vacuum readings collected from active recovery wells have ranged from 14.5 of mercury to 17.0 inches of mercury. Aquaterra environmental technicians measured the vacuum of the recovery wells in inches of mercury due to the tendency of inches of water gauges to exceed their measurement ranges when used to measure vacuum on recovery wells. Site vacuum readings are presented in Table 4.

Extraction well performance data is presented in Table 5. CAS air emissions monitoring is presented in Table 6.

- PM-4:** The overall contaminant removal efficiency of the corrective action system shall not be less than 98%. If the overall contaminant removal efficiency drops below 98% a corrective action status meeting may be scheduled with the TDUST, the responsible party, and Aquaterra personnel to discuss possible problems and solutions to reestablish an appropriate contaminant removal efficiency. The remediation system has had a contaminant removal efficiency of in excess of 98 % for BTEX, MTBE, and naphthalene concentrations, based on analytical results of effluent samples.
- PM-5:** A contaminant mass reduction of 66% shall be achieved within the first two years of operation of the corrective action system. If a contaminant mass reduction of 66% is not achieved within two years of the startup of the system a corrective action status meeting may be scheduled with the TDUST, the responsible party, and Aquaterra personnel to discuss possible problems and solutions to increase the contaminant mass rate reduction. Based on analytical results of the remediation systems influent and effluent samples collected for the site, a contaminant mass reduction of 66% within the first two years of operation is achievable. Based on the most recent soil and groundwater analytical data, contaminant mass reduction is occurring and the contamination plume is being recovered.

**CAS Progress:**

Based on the above presented information the remediation system is performing within previously established performance ranges and is meeting the remediation goals discussed in the above sections of this report. The replacement of spent activated carbon and worn parts has reduced the runtime of the remediation system, however down time associated with the repair and maintenance of the remediation system is a necessary part of its continued operation.

## **B. Problems**

Provide a detailed summary of any problem(s) that have been encountered since the previous report, actions taken to resolve the problem(s), and any complaints received or reported impacts from the release. If the CAS was non-operational when the CAC left the site for the day, then a detailed description shall be provided. If the CAS has been non-operational or down for extended periods of time greater than seventy-two (72) consecutive hours, then detailed documentation and an explanation for the delay shall be provided. An appendix shall contain the CASDR for each seventy-two (72) hour documented occurrence and each CASRL completed during the monitoring period.

If the CAS is operating for less than eighty-five percent (85%) of the reporting period, then detailed documentation of the reason for the downtime and efforts to reactivate the CAS shall be submitted.

**See Appendix D: CAS Field Logs**

**See Appendix E: CAS Down Reports**

**See Appendix F: CAS Repair Logs**

### **Problems Encountered:**

The only problems encountered during this reporting period can be attributed to sediment clogging of the carbon vessels, the replacement of the carbon in the vessels, electrical outages, power fluctuations, maintenance of the system involving replacing air water stripper tubes, replacing damaged air water stripper probe, and routine maintenance.

### **Field Activities:**

#### **Soil Sampling:**

On August 2, 2011 an Aquaterra drill crew mobilized to the site to collect subsurface soil samples from two locations across the site. Soil samples were collected from two areas adjacent to the west the former UST tank pit. Previous soil samples collected from these areas were identified as B-1 8–10 feet below the ground surface and B-2 10–12 feet below the ground surface. The bi-annual soil samples were collected from adjacent to and from the same depths as the previously collected soil sample locations B-1 and B-2.

#### **Groundwater Sampling:**

Aquaterra personnel measured static water levels in all monitoring wells on August 3, 2011. The wells were first uncapped to allow the water level in each well to equilibrate to atmospheric pressure.

Monitoring wells MW-7, MW-12, MW-15 and recovery wells DRW-3 and DRW-4 were purged of at least three well volumes of groundwater and sampled with disposable polyethylene bailers. Purging and sampling procedures were conducted at the site in general accordance with the TDEC-DUST 1996 Reference Handbook.

## C. Results

### 1. Soil analytical data

If no soil contamination exists above the applicable RBCLs or SSCLs, then the report shall state that this section is not applicable. If soil sampling was not required for this reporting period, then, if applicable, provide the date of the next scheduled soil sampling event.

#### **Soil Analytical Results:**

Soil samples from both borings were collected continuously with four-foot MacroCore<sup>®</sup> samplers from the unconsolidated interval of each of two borings (SB-1 and SB-2) using a Geoprobe<sup>®</sup> drill rig. Soil samples were visually observed for geologic logging purposes. The soil characteristics such as soil type, color, moisture, consistency, odor, and plasticity were recorded on soil boring logs. Each soil sample was split and a portion of the soil sample was collected into a new, dedicated container for headspace screening analysis using an organic vapor analyzer (OVA) to detect the presence of volatile organic vapors (VOVs). A portion of soil from selected intervals was placed into laboratory-supplied sample containers, properly labeled, and then placed in a cooler containing ice. Each soil sample collected for headspace screening was allowed to equilibrate for a minimum of 15 minutes, permitting volatile organic compounds (VOCs) in the samples to volatilize into the headspace of the bag.

Soil intervals selected for laboratory analysis are indicated on the Boring Logs included as Appendix A. One soil sample from each of the two soil borings was selected for laboratory analysis. The soil sample from soil boring SB-1 was collected at 8 - 10 feet below ground surface (bgs). The laboratory soil samples were packed in appropriate laboratory containers, preserved on ice in a cooler, and delivered under chain of custody to Test America of Nashville, Tennessee for analyses.

Both soil boring SB-1 and SB-2 were sampled on August 2, 2011 for benzene, toluene, ethylbenzene, and xylenes (BTEX), MTBE, and naphthalene. Analytical data indicated that the soil sample collected from SB-2 10–12 feet bgs was below the site specific action level. However, the soil sample collected from SB-1 8–10 feet bgs was above the site specific action level for benzene in soil of 0.0757 ppm. The benzene level encountered in the soil sample collected from SB-1 was 0.162 ppm. The previously collected soil sample from the same area previously identified as B-1 contained a benzene concentration of 1.81 ppm. The soil analytical data does indicate a reduction in the benzene concentration from the previous sample collected from the B-1 area.

**Based on the above presented soil analytical data, bi annual soil sampling should be continued in the vicinity of B-1 / SB-1. The next soil sampling event should be conducted in August 2013.**

- a. Provide soil analytical results from all events in the “Soil Analytical Results Table” located in the “Corrective Action Workbook” for the applicable COCs. A summary of any new soil investigation activities shall be included with the report. A detailed boring log shall be prepared in accordance with TGD-006 for each new boring and included in an appendix.

**See Appendix A: Boring Logs**

**See Table 7: Soil Analytical Summary**

Table 7  
 Soil Analytical Summary  
 Quik-N-Easy Market, Facility ID # 4-800064  
 Carthage, Tennessee

Sample ID	Date	Interval (feet)	OVA Readings	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	TPH GRO	EPH
Site Specific Clean-up Levels				0.0757	6.78	143	9.6	39.6	135	-	500
MW-1	2/1/95	18-19	200	0.0022	ND	NA	0.0077	NA	NA	ND	NA
MW-2	2/1/95	22-23	43	0.0028	ND	NA	0.0021	ND	NA	ND	NA
MW-3	2/2/95	19-20	2	ND	ND	NA	ND	NA	NA	ND	NA
MW-4	2/2/95	16-17	120	ND	ND	NA	ND	NA	NA	ND	NA
	2/2/95	19-20	270	0.0021	0.11	NA	0.279	NA	NA	ND	NA
MW-10	10/18/00	16-17	3.3	ND	ND	ND	ND	ND	NA	ND	37.7
	10/18/00	21-22	3.6	ND	ND	ND	ND	ND	NA	ND	6.41
MW-12	10/18/00	6-7	9.1	ND	ND	ND	ND	ND	NA	ND	ND
	10/18/00	21-22	28.6	ND	0.0044	0.0056	0.0497	0.12	NA	ND	ND
SB-12	8/14/02	10-12	7.3	ND	ND	ND	ND	ND	ND	ND	NA
	8/14/02	14-16	8.2	ND	ND	ND	ND	ND	ND	ND	NA
MW-13	8/14/02	7-9	4.3	ND	ND	ND	ND	ND	ND	ND	NA
	8/14/02	11-13	6.4	ND	ND	ND	0.0021	ND	ND	ND	NA
	8/14/02	15-17	5.2	ND	ND	ND	0.0022	ND	ND	ND	NA
MW-14	8/14/02	2-4	1.8	ND	ND	ND	ND	ND	ND	ND	NA
	8/14/02	6-8	1.4	ND	ND	ND	ND	ND	ND	ND	NA
	8/14/02	10-12	0.8	ND	ND	ND	ND	ND	ND	ND	NA
MW-15	1/14/03	10-12	63	0.0091	0.3	2.54	16.4	0.102	3.74	85.2	NA
	1/14/03	14-16	51	0.0557	0.205	0.155	0.995	0.125	0.41	60.6	NA
	1/14/03	20-22	2	0.0369	0.0029	0.0253	0.0184	0.167	0.026	ND	NA
MW-16	1/14/03	14-16	5	ND	ND	ND	0.0031	ND	ND	ND	NA

All results reported in parts per million

ND - Non-Detect

NA - Not Analyzed

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ENVIRONMENTAL CONTROL  
POLYMER CONTROL

**Table 7**  
**Soil Analytical Summary**  
**Quik-N-Easy Market, Facility ID # 4-800064**  
**Carthage, Tennessee**

Sample ID	Date	Interval (feet)	OVA Readings	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	TPH GRO	EPH
Site Specific Clean-up Levels				0.0757	6.78	143	9.6	39.6	135	-	500
MW-16 Cont.	1/14/03	16-18	5	ND	ND	ND	ND	ND	ND	ND	NA
MW-17	7/29/03	4-6	0.4	ND	ND	ND	ND	ND	NA	ND	NA
	7/29/03	6-8	0.4	0.0044	0.0068	ND	0.0112	ND	NA	ND	NA
MW-18	7/30/03	10-12	2.3	ND	ND	ND	ND	ND	NA	ND	NA
	7/30/03	33-35	0.7	ND	ND	ND	0.002	ND	NA	ND	NA
	7/30/03	45-47	-	ND	ND	ND	0.0021	ND	NA	ND	NA
MW-19	7/30/03	0-2	6.4	ND	ND	ND	ND	ND	NA	ND	NA
	7/30/03	4-6	6.9	0.0038	ND	ND	ND	0.0181	NA	ND	NA
B-1	8/20/08	8-10	11.2	1.81	0.0211	0.0967	11.6	0.815	<0.00484	NA	206
B-2	8/20/08	10-12	10.3	0.0956	0.00925	0.00396	0.0957	0.0583	<0.00496	NA	26.6
B-3	8/20/08	10-12	6.9	0.0511	<0.00195	0.00201	<0.00491	0.075	<0.00487	NA	5.49
B-4	8/20/08	10-12	5.7	0.0728	0.00488	0.00358	0.0128	0.0501	0.00725	NA	ND
B-5	8/20/08	4-6	5	0.0272	0.00275	0.00442	0.0569	0.0254	<0.00487	NA	ND
B-6	8/20/08	4-6	0	<0.00192	<0.00192	<0.00192	<0.00480	<0.00189	<0.00480	NA	5.69
B-7	8/20/08	4-6	0	<0.00200	<0.00200	<0.00200	<0.00499	<0.00197	<0.00499	NA	<3.88
B-8	8/20/08	4-6	49	0.00204	0.00303	0.00992	0.0468	0.0153	0.0449	NA	5.76
DRW-1	3/31/09	4-6	0.7	<0.00197	0.00362	<0.00197	<0.00492	0.00197	<0.00492	NA	NA
DRW-2	4/2/09	18-20	419	0.00539	0.0117	0.97	6.38	<0.00197	1.54	NA	NA
	4/2/09	22-24	543	<0.0859	0.114	2.8	15.8	<0.0859	2.38	NA	NA

All results reported in parts per million

ND - Non-Detect

NA - Not Analyzed

**Table 7**  
**Soil Analytical Summary**  
**Quik-N-Easy Market, Facility ID # 4-800064**  
**Carthage, Tennessee**

Sample ID	Date	Interval (feet)	OVA Readings	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene	TPH GRO	EPH
Site Specific Clean-up Levels				0.0757	6.78	143	9.6	39.6	135	-	500
DRW-2 Cont.	4/2/09	26-28	144.8	0.00281	<0.00169	0.0515	0.0272	0.00381	0.051	NA	NA
DRW-3	4/6/09	20-22	50	0.022	0.00464	0.0164	0.0301	0.127	0.0147	NA	NA
	4/6/09	22-24	51	0.0549	0.102	0.0216	0.133	0.269	0.0211	NA	NA
	4/6/09	24-26	52	0.416	4.34	2.66	14.9	0.875	0.0667	NA	NA
DRW-4	4/7/09	18-20	441	0.0881	0.918	2.28	8.63	0.0278	1.11	NA	NA
	4/7/09	20-22	373	0.178	0.0246	0.132	0.345	0.042	0.102	NA	NA
	4/7/09	24-26	23.1	0.0492	0.174	0.443	1.63	0.0158	0.0299	NA	NA
SRW-1	4/1/09	24-26	33.4	<0.00187	<0.00187	<0.00187	<0.00466	0.191	<0.00466	NA	NA
	4/1/09	26-28	29.3	<0.00185	<0.00185	<0.00185	<0.00461	0.0478	0.00553	NA	NA
	4/1/09	30-31	13.6	0.00623	0.00174	<0.00173	0.00446	0.016	<0.00432	NA	NA
SRW-2	4/1/09	10-12	665	1.41	24.3	12.5	62.6	<0.0871	5.72	NA	NA
	4/1/09	20-22	1299	0.517	2.91	1.46	7.04	0.456	0.111	NA	NA
	4/1/09	24-26	654	1.95	3.81	2.14	10.2	2.27	0.772	NA	NA
SRW-3	4/1/09	18-20	248	0.0141	0.00262	0.036	0.0617	<0.00190	0.0541	NA	NA
	4/1/09	22-24	282	0.00277	0.00288	<0.00173	0.00512	0.00231	0.0323	NA	NA
	4/1/09	24-26	87.1	0.00411	0.00461	0.0133	0.0986	0.0134	0.101	NA	NA
SB-1	8/2/11	8-10	2.1	0.0162	0.0204	0.0272	0.243	0.0974	<0.00439	NA	NA
SB-2	8/2/11	10-12	0	0.00929	0.0028	0.00207	0.0157	0.00213	<0.00478	NA	NA

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Quik-N-Easy Market, Facility ID # 4-800064  
Carthage, Tennessee

All results reported in parts per million  
ND - Non-Detect  
NA - Not Analyzed

- b. All original laboratory analysis and chain of custody sheets for this monitoring period shall be provided in an appendix. All laboratory analysis sheets shall include the following:
  - i. UST Facility Identification Number;
  - ii. Boring number or location of additional sampling points;
  - iii. Date sample was collected;
  - iv. Date sample was analyzed;
  - v. Parameter analyzed (i.e., the appropriate COCs);
  - vi. Analytical method;
  - vii. Detection limit;
  - viii. Dilution factor;
  - ix. Unit of measurement (ppm); and
  - x. Authorized laboratory signature - the signature page shall indicate the number of pages within the laboratory report

2. Potentiometric data

- a. Provide water level data for all sampling events in the "Potentiometric Data Table" located in the "Corrective Action Workbook". All measurements shall be recorded to 0.01 feet.
- b. Provide two (2) scaled site maps including potentiometric data collected at least thirty (30) days apart during the last two (2) monitoring periods. If multiple aquifers were investigated and sufficient data is generated, then potentiometric maps shall be included for each aquifer. Each map shall also include an arrow depicting the interpreted direction(s) of ground water flow.

**Potentiometric Data:**

Depths to groundwater on August 3, 2011 ranged from 1.81 feet below the top of casing (TOC) at monitoring well MW-19 to 58.90 feet below the TOC at monitoring well MW-7. Free phase product was detected in the groundwater monitoring well MW-12 at a thickness of 0.22 feet. This is a decrease in free product thickness from the previous sampling event. The free product was bailed from the well and placed into the remediation system for processing and disposal. Depth to water measurements recorded during the August 3, 2011 event were used to determine groundwater elevations above mean sea level. The current and historical water level and product thickness data are summarized in Table 8.

Figure 1 is a site map identifying surface structures and monitoring well locations. The potentiometric surface map for the previous sampling event is shown as Figures 2 and 3 and the potentiometric surface elevations for the August 3, 2011 sampling event is shown as Figures 4 and 5.

3. Free product data

Provide a description of the method for management and disposal of the free product.

**Free phase product was detected in the groundwater monitoring well MW-12. Potentiometric data collected in the field indicated 0.22 feet of free product encountered in groundwater monitoring well MW-12. This is a decrease in free product thickness from the previous sampling event. The free product was bailed from the well and placed into the remediation system for processing and disposal. Figure 6 shows the location of free product.**



4. Water analytical data

If no ground water contamination exists above the applicable RBCLs or SSCLs, then the report shall state that this section is not applicable, unless water receptors are being monitored as directed by the Division.

a. Tables

- i. Provide water analytical results from all events in the "Water Analytical Results Table" located in the "Corrective Action Workbook" for the applicable COCs, including all ground water, drinking water supply, and surface water analytical results. A summary of any new water investigation activities shall be included with the report.
- ii. Provide water analytical results from all events in the "Influent/Effluent Analytical Results Table" located in the "Corrective Action Workbook" for the applicable permit required COCs.
- iii. Provide all original laboratory analysis and chain of custody sheets for this monitoring period in an appendix. All laboratory analysis sheets shall include the following:
  - (a) UST Facility Identification Number;
  - (b) Monitoring well number or location of additional sampling points;
  - (c) Date sample was collected;
  - (d) Date sample was analyzed;
  - (e) Parameter analyzed (i.e., the appropriate COCs);
  - (f) Analytical method;
  - (g) Detection limit;
  - (h) Dilution factor;
  - (i) Unit of measurement (ppm); and
  - (j) Authorized laboratory signature - the signature page shall indicate the number of pages within the laboratory report

**Groundwater Analytical Results:**

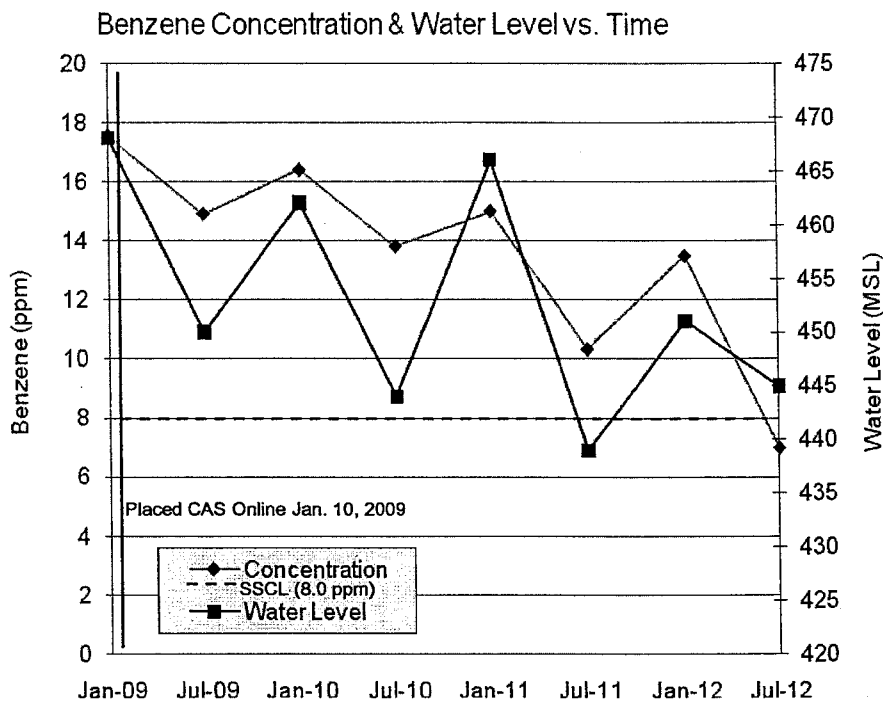
Analytical data collected during this monitoring period indicated benzene concentrations were found to be above the site specific cleanup level of 0.238 ppm in all the sampled groundwater monitoring wells and all the sampled groundwater recovery wells (DRW-3 and DRW-4). The concentrations of benzene encountered in the groundwater monitoring wells MW-7, MW-12 and MW-15 were 0.606 ppm, 3.83 ppm, and 0.290 ppm, respectively. The concentrations of benzene encountered in the groundwater recovery wells DRW-3 and DRW-4 were 0.593 and 0.363, respectively. The benzene levels reported during this event indicates a decrease in concentrations from the previous sampling event in the groundwater monitoring wells MW-12 and MW-15. The analytical data

also indicates an increase in benzene concentrations in the groundwater monitoring well MW-7 and both sampled groundwater recovery wells DRW-3 and DRW-4. In addition to the benzene being above the site specific action level of 0.290 ppm in the groundwater monitoring well MW-12, analytical data indicated that the concentration of xylenes in monitoring well MW-2 was also above the site specific action level of 12.3 ppm at a concentration of 16.6 ppm. This is a decrease in concentration from the previous groundwater sampling event. All detected contaminant concentrations were reported to be below their respective site specific cleanup levels in the influent and effluent samples collected from the remediation system.

The laboratory analytical results for dissolved BTEX constituents, MTBE, and naphthalene concentrations in groundwater are summarized in Tables 9 and 10. The original analytical report with the chain of custody record for the most recent sampling event is included as Appendix G.

b. Graphs

- i. Provide a graph for each well sampled during the monitoring event showing ground water contaminant concentrations for all applicable COCs detected above the applicable RBCLs or SSCLs and ground water levels versus time. A dashed line shall indicate the applicable cleanup level for RBCLs or SSCLs. Only one COC shall be shown on any one graph. All ground water data shall be used and the point in time when the CAS became operational shall be indicated. Graphs shall indicate the information as shown in the example:



- ii. Provide a graph showing the influent and effluent contaminant concentrations for each monitoring event for all COCs that exceed the applicable RBCL or SSCL for the site.

**Time vs. Concentration Graphs are presented in Appendix H.**

c. Maps

Provide a separate, plan view scaled site map showing the horizontal extent and most recent concentration for each COC that exceeds the applicable RBCL or SSCL **in more than one well**. All contaminant plumes shall be defined to the applicable RBCL or SSCL. The horizontal extent and thickness (in feet) of any free product shall be depicted on each map.

**See Figure 7: Benzene Concentrations in Soil**

7. CAS performance and supporting data

a. CAS performance data

The following tables shall be completed and provided in this section of the monitoring report. These tables are located in the "Corrective Action Workbook".

- i. CAS Monthly Runtime Table
- ii. CAS Air Emissions Monitoring Table
- iii. CAS Performance Data Table
- iv. Extraction Well Performance Data Table
- v. System Status and Inspection Table

b. CAS supporting data

Provide the following information in chronological order in separate appendices for the monitoring period:

- i. First and last telemetry facsimile daily report for the monitoring period and any alarm facsimile received during the period (including an alarm code key);
- ii. CASFLs;
- iii. CASRL(s), if applicable; and
- iv. CASDR(s), if applicable.

## II. Additional Information and Recommendations

Provide a discussion of any additional information and/or recommendations concerning the site remediation activities.

### **Additional Information:**

#### **Conclusions and Recommendations -**

Evaluation of groundwater elevation and hydrocarbon contaminant concentrations to date allows for conclusions to be made with regard to the environmental status of the site as well as recommendation for future action to render the site to an acceptable environmental status. These conclusions are as follows:

1. Analytical results of groundwater samples collected on August 3, 2011 indicate that benzene concentrations were found to be above the site specific cleanup level of 0.238 ppm in the groundwater samples collected from monitoring wells MW-7, MW-12 and MW-15 and the recovery wells DRW-3 and DRW-4 at concentrations of 0.606 ppm, 0.383 ppm, 0.290 ppm, 0.593ppm, and 0.363 ppm, respectively.

7. CAS performance and supporting data

a. CAS performance data

The following tables shall be completed and provided in this section of the monitoring report. These tables are located in the "Corrective Action Workbook".

- i. CAS Monthly Runtime Table
- ii. CAS Air Emissions Monitoring Table
- iii. CAS Performance Data Table
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b. CAS supporting data

Provide the following information in chronological order in separate appendices for the monitoring period:

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- iii. CASRL(s), if applicable; and
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## II. Additional Information and Recommendations

Provide a discussion of any additional information and/or recommendations concerning the site remediation activities.

### **Additional Information:**

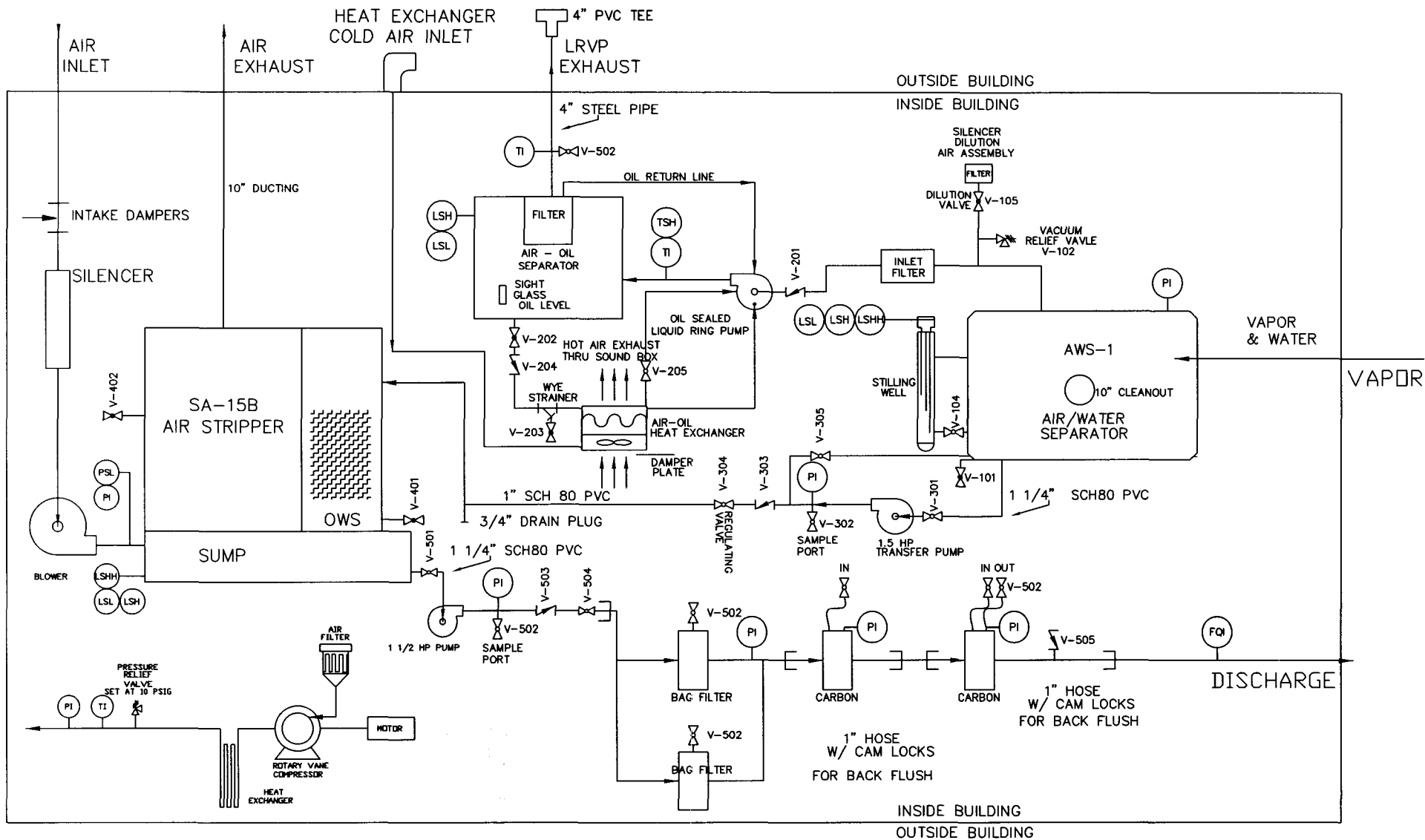
#### **Conclusions and Recommendations -**

**Evaluation of groundwater elevation and hydrocarbon contaminant concentrations to date allows for conclusions to be made with regard to the environmental status of the site as well as recommendation for future action to render the site to an acceptable environmental status. These conclusions are as follows:**

1. Analytical results of groundwater samples collected on August 3, 2011 indicate that benzene concentrations were found to be above the site specific cleanup level of 0.238 ppm in the groundwater samples collected from monitoring wells MW-7, MW-12 and MW-15 and the recovery wells DRW-3 and DRW-4 at concentrations of 0.606 ppm, 0.383 ppm, 0.290 ppm, 0.593ppm, and 0.363 ppm, respectively.

Appendix B

Standard Drawings



LABEL	DESCRIPTION	VALVE TYPE	LABEL	DESCRIPTION	VALVE TYPE	LABEL	DESCRIPTION	VALVE TYPE	LABEL	DESCRIPTION	VALVE TYPE	LABEL	DESCRIPTION	VALVE TYPE
V-101	AWS-1 DRAIN	1\" BALL VALVE	V-201	AIR/OIL FLOW CHECK	4\" CHECK VALVE	V-301	AWS-1 PUMP ON/OFF	1-1/4\" BALL VALVE	V-401	OWS DRAIN	1\" BALL VALVE	V-501	SUMP PUMP ON/OFF	1-1/4\" BALL VALVE
V-102	VACUUM RELIEF	2\" VACUUM RELIEF	V-202	SEAL OIL ON/OFF	4\" BUTTERFLY	V-302	INFLUENT SAMPLE PORT	1/4\" BALL VALVE	V-402	AIR STRIPPER DRAIN	1\" BALL VALVE	V-502	EFFLUENT SAMPLE PORT	1/4\" BALL VALVE
V-103		1/4\" BALL VALVE	V-203	1/2\" SEAL OIL DRAIN	1/2\" BALL VALVE	V-303	AWS-1 CHECK VALVE	1\" BALL CHECK				V-503	SUMP CHECK VALVE	1\" BALL CHECK
V-104	STILLING WELL ON/OFF	1\" GATE VALVE	V-204	SEAL OIL CHECK VALVE	1\" SWING CHECK	V-304	AWS-1 FLOW REGULATOR	1\" BALL VALVE				V-504	SUMP FLOW REGULATOR	1\" BALL VALVE
V-105	DILUTION VALVE	2\" BALL VALVE	V-205	SEAL OIL VENT VALVE	1/4\" BALL VALVE	V-305	AWS-1 RECIRCULATION	1/2\" BALL VALVE				V-505	ANTI-SIPHON VALVE	3/4\" VAC RELIEF

VACUUM  
PRESSURE  
SWITCH  
LIQUID LEVEL OR LOW T

I  
FOI  
FRI

INDICATOR  
FLOW QTY IND. (TOTALIZER)  
FLOW RATE INDICATOR  
TEMPERATURE



DATE:  
9/2/09

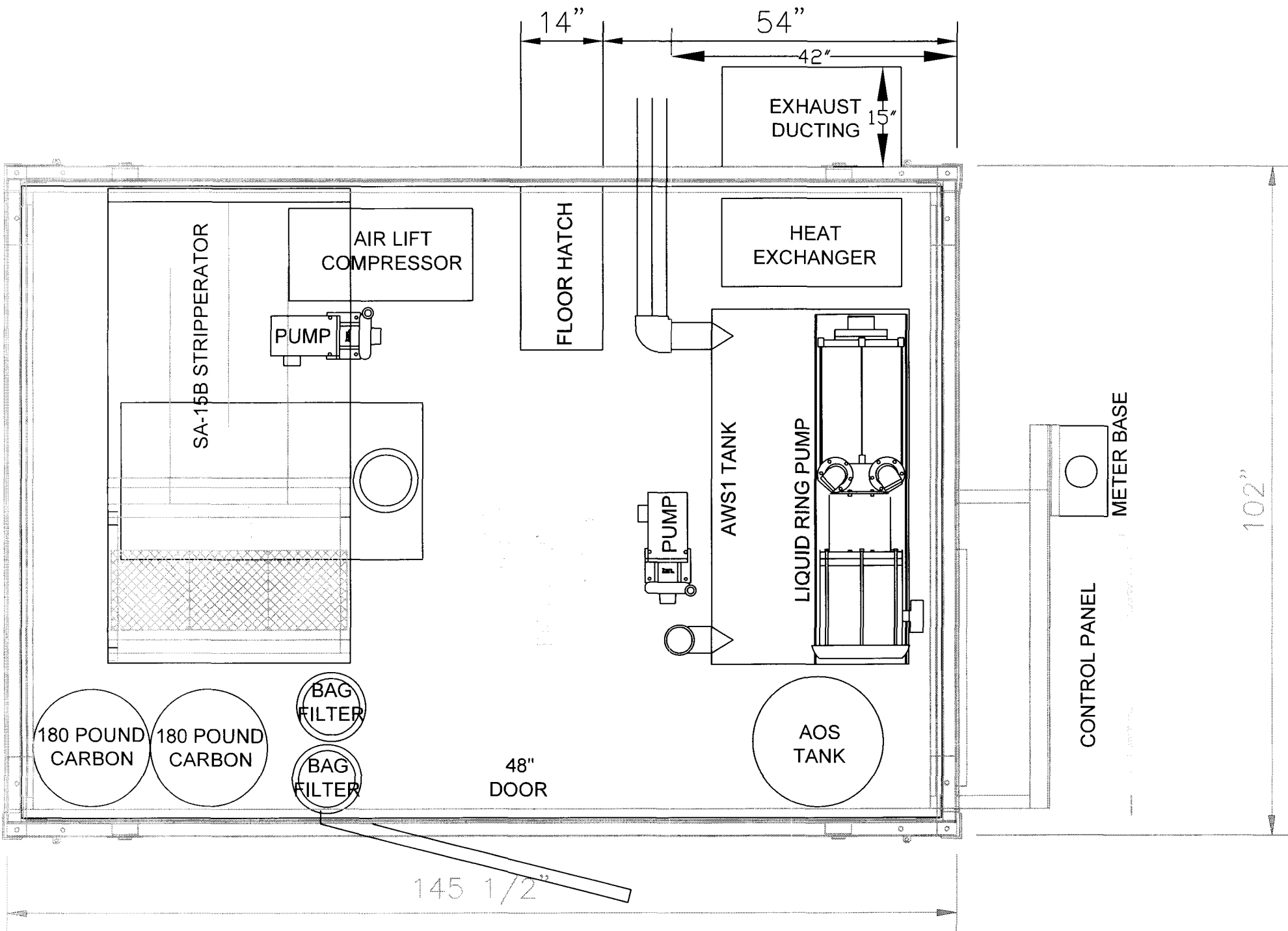
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TDEC AIR LIFT CAS



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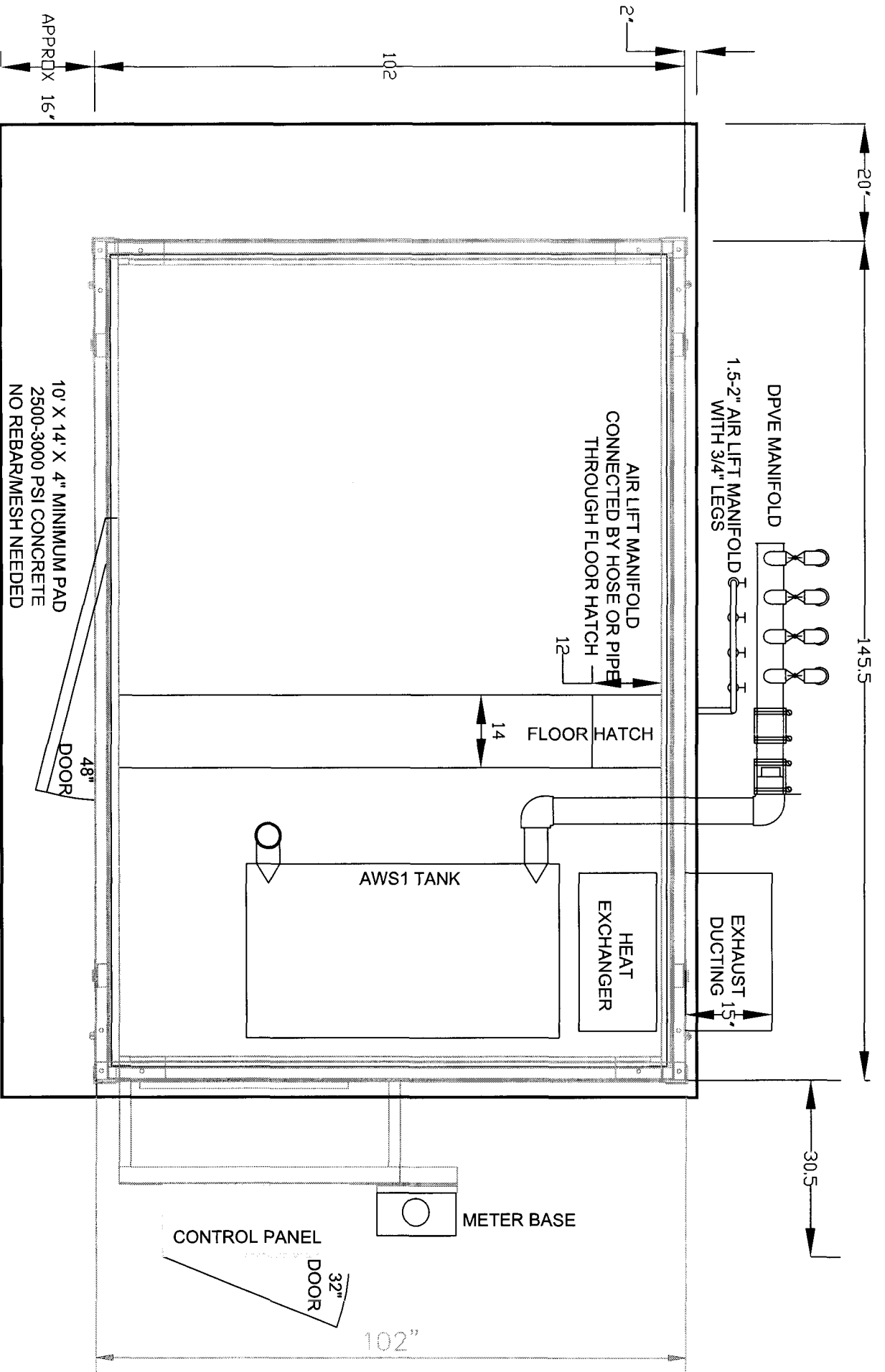
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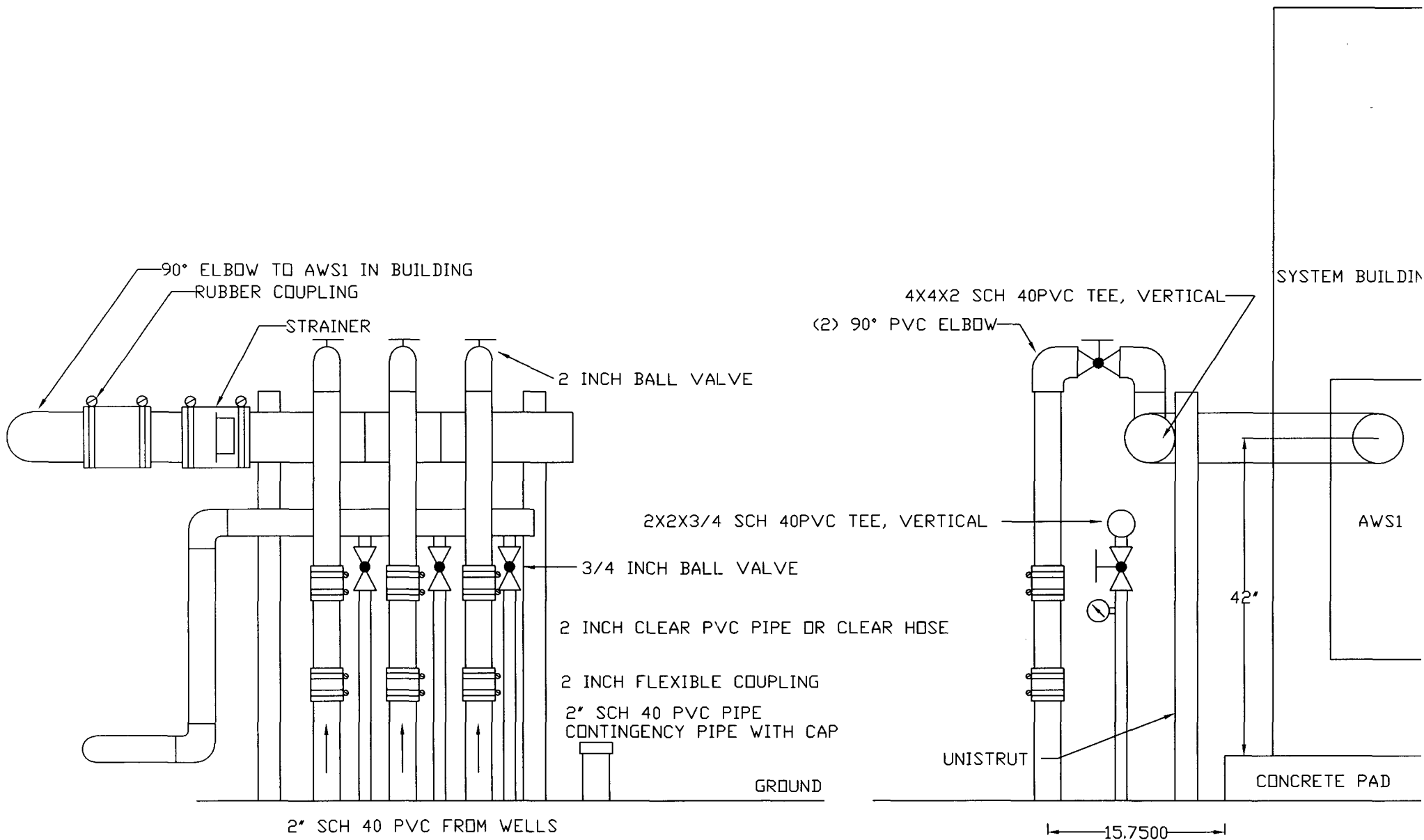
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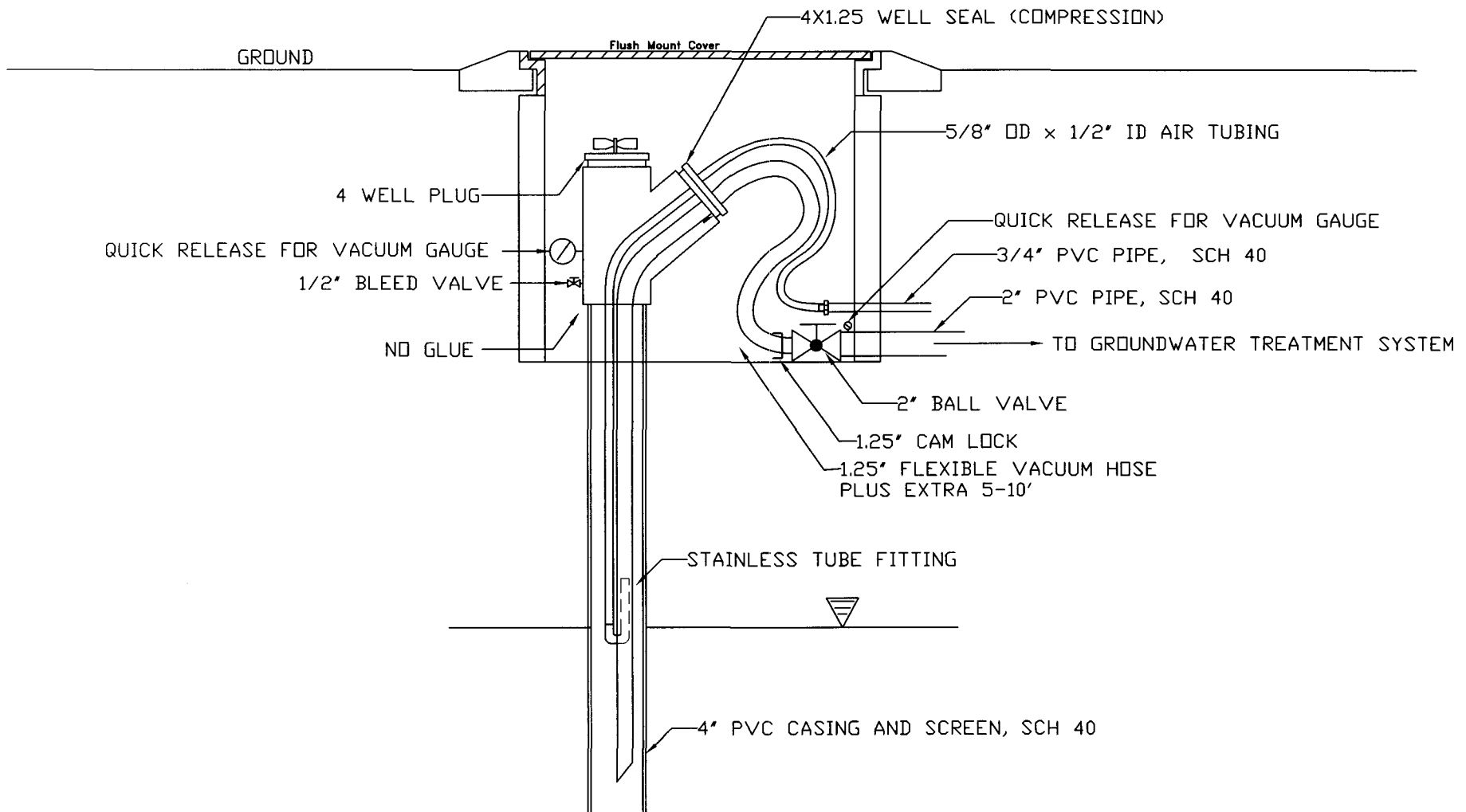
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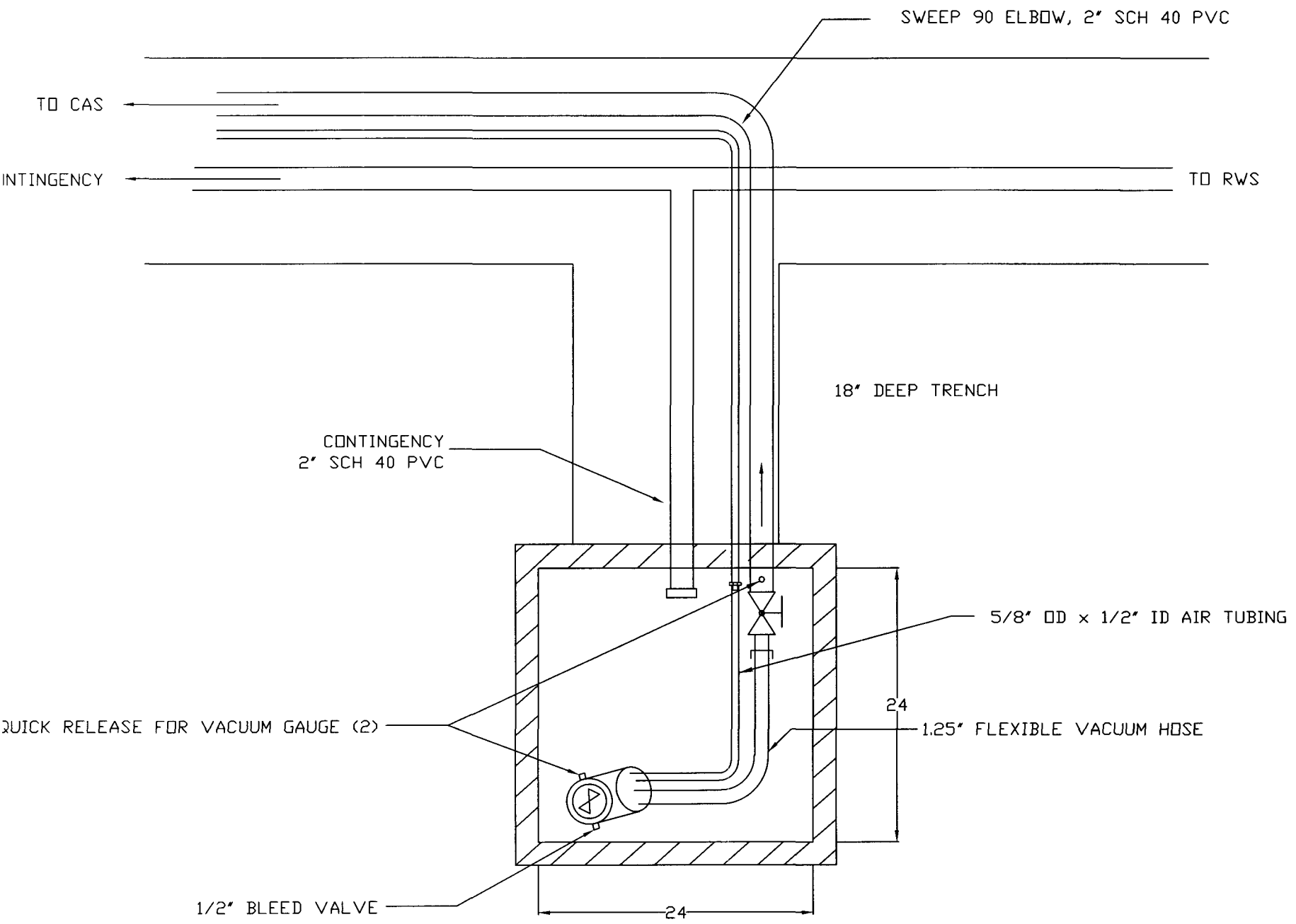
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# CAS LAYOUT TDEC AIR LIFT CAS









# MK ENVIRONMENTAL ON-SITE PLATFORM

INSULATED, REMOVABLE WALL PANELS

TYPICAL OF AN 8' X 12' PLATFORM

